A REVIEW OF THE AUSTRALIAN HAWK MOTHS OF THE GENUS *MACROGLOSSUM* SCOPOLI (LEPIDOPTERA: SPHINGIDAE)

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Abstract

The nomenclature of the 13 *Macroglossum* species occurring in Australia is reviewed, lectotypes are designated for *Macroglossa approximata* Walker, and *M. micaceum* Walker, and detailed distributions given for the first time. A key to species is provided and each species illustrated.

Introduction

Remarkably little has been published on the Australian hawk moths; the literature is scattered and fragmentary with few detailed data. This is particularly so in the genus *Macroglossum* Scopoli, possibly because most of the Australian species are usually rare or uncommon in collections. In this paper I review the systematics of the 13 species found in Australia and list synonymies and detail distributions.

Very few life-history details for Australian *Macroglossum* species appear in the literature. Food plants have been recorded for only one species, *M. hirundo* Boisduval (Moulds 1984) and there is no description of any early stage based on Australian material. There is, however, some data available for four wide-ranging species, *M. corythus* Walker, *M. insipidum* Butler, *M. heliophilum* Boisduval [= *fringilla* Boisduval] and *M. prometheus* Boisduval, from researches undertaken in China, India and Java by Mell (1922), Bell and Scott (1937) and Dupont & Roepke (1941). I have in preparation life-history descriptions for an additional four species.

The following abbreviations are used below: AH Anthony Hiller collection; AJG A. J. Graham collection; AM Australian Museum, Sydney; ANIC Australian National Insect Collection, C.S.I.R.O.. Canberra; BCRI Biological and Chemical Research Institute, N.S.W. Department of Agriculture, Rydalmere; BMNH British Museum (Natural History), London; CMNH Carnegie Museum of Natural History, Pittsburgh; DANT Department of Agriculture, N.T. Administration, Darwin; DL David Lane collection; DPI Department of Primary Industries, Brisbane; DPIM Department of Primary Industries, Mareeba; EJH E. J. Harris collection in James Cook University; EP E. Porteus collection; JO John Olive collection; MC Michael Cermak collection; MNP Museum National d'Histoire naturelle, Paris; MSM author's collection; HOPE Hope Department of Entomology, University Museum, Oxford; MV Museum of Victoria, Melbourne; QM Queensland Museum, Brisbane; RM Raymond Manskie collection; SAM South Australian Museum, Adelaide; UQ University of Queensland, Brisbane; WAM Western Australian Museum, Perth; WFG W. F. Gibb collection; WNBQ W. N. B. Quick collection.

When listing published distribution records below, those given in the literature as "Australia" or "New Holland" have been omitted.

The types of all species recorded as having come from Australia have been examined either directly or, in the case of those housed in BMNH and HOPE from colour transparencies. Some, but not all, types of species never recorded as Australian but synonymised by Rothschild and Jordan (1903) with species occurring in Australia have also been examined.

Key to adults

1. Hind wing above clearly marked by a broad unbroken bright yellowish orange transverse patch 2
— Hind wing above not so marked 10

2. Fore wing above with two transverse whitish bars, one median and almost straight, the other subterminal and gently curved . . . . . *M. dohertyi* Rothschild
— Fore wing above not so marked 3

3. Yellowish orange band on hind wing above with outer margin distinctly angled at about 90° (not angled by a broad sweeping curve); maximum fore wing length approximately 21 mm; hind wing below with edge of yellow orange zone against inner margin clearly defined 4
— Not with above combination of characters 5

4. Fore wing with basal ⅓ mostly blackish, the outer margin of this blackish area distinct and adjoined by a narrow pale transverse band, remainder of wing brownish with distinct blackish markings; abdomen without lateral yellowish orange bars . . . . *M. heliophilum queenslandi* Clark
— Fore wing above more or less even in tone, usually brownish or greyish, markings subtle with the principal ones appearing as curved transverse lines or bars at ⅓ and ⅔ distance from base; abdomen with 3 lateral yellowish orange bars (usually, but not always, distinct) . . . . *M. alcedo* Boisduval

5. Fore wing above with a distinct single transverse pale band at about mid point, this often constricted or broken at centre 6
— Fore wing above without a transverse pale band at mid point. 7

6. Hind wing above with yellowish orange band more or less regular in width and greater in area than blackish outer portion of wing . . . . . *M. hirundo errans* Walker
— Hind wing above with yellowish orange band irregular in width, broadest near tornal angle, this band less in area than blackish outer portion of wing . . . . . *M. rectans* R. & J.

7. Small insects with fore wing length rarely exceeding 18 mm; hind wing below with edge of yellowish orange zone against inner margin clearly defined . . . . . *M. insipidum papuanum* R. & J.

– Medium to large insects with fore wing length approaching 18 mm only in stunted specimens, mostly greater than 20 mm; hind wing below with edge of yellowish orange zone against inner margin very distinct 8

8. Fore wing above with apical area darkened, a broad greyish transverse subapical band constricted at centre by darkened apical area; yellowish orange on hind wing above clearly less than ½ wing area . . . . . *M. nubilum* R. & J.

– Not with above combination of characters 9

9. Fore wing above usually with a greyish patch against costa at about mid point and with a similar patch opposite against inner margin; abdomen sometimes with one, or occasionally two, lateral yellowish orange patches, the distal one the larger . . . . . *M. hirundo errans* Walker

– Fore wing above never with a greyish patch against inner margin similar to and opposite any such patch against costa; usually, however, with a greyish costal patch at about ⅓ distance from wing apex, this patch roughly triangular in shape; abdomen usually with two distinct lateral yellowish orange patches, the distal one the smaller . . . . . *M. prometheus lineatum* Lucas

10. Hind wing above suffused russet brown across basal half, the pigmentation more or less even in its distribution, the margins very blurred. . . . . *M. vacillans* Walker

– Hind wing above not so marked 11

11. Hind wing above with bluish white suffusion on basal half, sometimes with a slight greenish hue . . . . . *M. tenebrosum* Lucas

– Hind wing above with streaks or blotches of either brownish cream or yellowish orange on basal half (in some specimens appearing as a vestigal band) 12

12. Hind wing above with blotches of bright yellowish orange arranged more or less as a broken transverse bar across base of wing . . . . . *M. corythus pylene* C. Felder

– Hind wing above with streaks (usually two) of brownish cream near base 13

13. Fore wing above without distinct darkened transverse bands; hind wing below usually distinctly suffused whitish or pale brownish on basal half; abdomen with two pale yellowish to creamish lateral patches, one each on segments 3 and 4, these patches often indistinct, that on segment 3 clearly the larger . . . . . *M. micaceum micaceum* Walker

– Fore wing above with darkened transverse bands at about ⅓ and ⅔ distance from base (usually distinct, but sometimes obscured); hind wing below not suffused whitish, always suffused brownish yellow to reddish brown on basal half; abdomen with four deep orange lateral bars, one each on segments 2-5, those of 3-5 nearly always distinct, that of 2 narrower but longer than the other 3 . . . . *M. joannisi* R. & J.

Genus *Macroglossum* Scopoli

Macroglossum Scopoli, 1777, *Intr. Hist. Nat.*: 414. Type species: *Sphinx stellatarum* L.
Macroglossa Boisduval, 1833, *Nouv. Annls Mus. Hist. nat. Paris* 2: 226 (an unjustified emendation of *Macrolgossum*).
For full synonomy of the genus see Wagner (1915), Fletcher and Nye (1982).

M. vacillans Walker

(Figs 1, 9)

Macroglossa vacillans Walker, 1864: 27 (Timor).
TYPE (examined):– HOPE; holotype ♀ (not ♂ as stated in original description), bearing seven labels as follows: 1) Tim.; 2) Wallace; 3) coll Saunders; 4) 30; 5) Timor, Ex Coll. (1830-73) W. W. Saunders. Presented 1873 by Mrs. F. W. Hope. m.s. locality by W.W.S.; 6) TYPE, WALKER, Brit. Mus. Cat. Vol. 31. (1864), page 27, Coll. Hope Oxon.; 7) TYPE LEP.: No. 34, Macroglossa vacillans Walker, HOPE DEPT. OXFORD.
Macroglossa approximata Walker, 1864 (*non* Miskin, 1891): 27-28 (North Australia).
TYPES (examined):– BMNH; syntype series of seven specimens; four specimens traced. *Lectotype here designated*, ♀, which bears a circular label on which is handwritten "North Austral", a rectangular label on which is handwritten "approximata" and another circular label edged red on which is printed "Type" and now also carrying a red rectangular label stating "LECTOTYPE Macroglossa approximata Walker, Moulds 1985".
Macroglossa pseudogyrans Rothschild, 1894: 68, pl. 5, fig. 23 (Dili and Flores, Indonesia).
TYPES (not examined):– BMNH; type series.
Macroglossa similis Rothschild, 1894: 68 (Oinanisa, Timor).
TYPES (not examined):– BMNH; type series.

DISTRIBUTION

From Koolan Island, north-western Australia, across the northern third of Northern Territory and northern Queensland from the Torres Strait islands to Paluma; at times common, primarily at the beginning of the wet season. The occurrence of specimens in such a contrasting variety of habitats (lush rain forest to dry inland areas) and on arid off-shore islands (Koolan Is, Rimbija Is) suggests that the species is migratory.

Range beyond Australia: New Guinea and eastern Indonesia.

Published records (Australia only). Queensland (Rothschild and Jordan 1907, Wagner 1915); Cardwell (Miskin 1891).

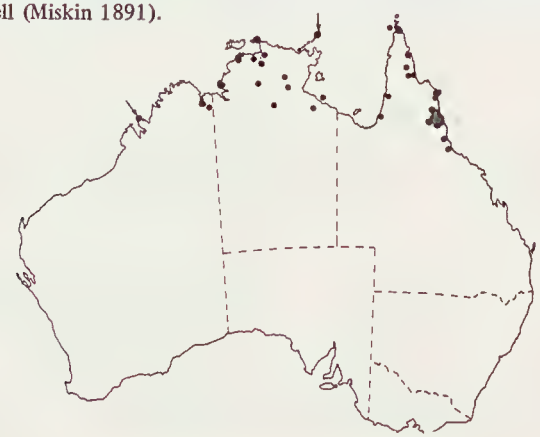


Fig. 1. Distribution of *M. vacillans* Walker.

Records from material examined. WESTERN AUSTRALIA: Koolan Islands (near Derby), Feb.; Wyndham, Nov.-Jan., Mar.; Kununurra, Sep., Dec.-Mar. (ANIC, AM, MSM, WAM). NORTHERN TERRITORY: Darwin, Feb.-Apr., June, Aug., Nov.; Cobourg Peninsula, Jan.; Rimbija Is., Wessel Islands, Jan.; Koongarra (Kakadu Nat. Park), Nov.; Wildman River, Arnhem Highway, Nov.; East Aligator River area, May, June; Daly River Mission, Jan.; Mainoru (ENE of Katherine), Dec.; Katherine/Katherine Gorge, Mar., Oct.; Roper River, Apr.; 80 km S of Larrimah, Jan.; Borroloola area, Oct., Nov.; Horn Islet, Pellew Group, Gulf of Carpentaria, Feb. (ANIC, DANT, DPIM, MSM, MV, SAM, UQ). QUEENSLAND: Booby Is., Torres Strait, Dec.; Cape York, May; Iron Range, Apr., May; Archer R. crossing, N of Coen, Dec.; Kowanyama (formerly Mitchell River Mission), Jan.; Kelso Inlet, N of Normanton, Dec.; Silver Plains, Jan., Mar.; Port Stewart, Jan.; Stewart River, Jan.; 57 km ESE of Coen, Dec.; McIvor River, July; Cooktown, Apr., May, Dec., Jan.; Mt Windsor Tableland, NW of Mossman, Jan.; Whyanbeel Ck, 8 km NNW of Mossman, Mar.; Cairns, May; Holloways Beach (near Cairns), Dec., Jan.; Kamerunga (near Cairns), Sep.; Kuranda, Jan., Feb., Apr., Dec.; Yungaburra, Apr.; Atherton, Jan., Mar.; Stannary Hills (near Herberton); Almaden, Chillago dist., Jan.; Gordonvale, Jan.; Meringa (near Gordonvale), Feb.; Paluma, Jan. (AH, AM, ANIC, DL, DPIM, MSM, MV, QM, SAM).

There is a specimen in DPI labelled "Brisbane". The absence of other records south of Paluma strongly suggests that the labelling of this specimen is erroneous and consequently the locality is here excluded from the distribution of the species.

M. alcedo Boisduval

(Figs 2, 8)

Macroglossa alcedo Boisduval, 1832: 188-189 (Dorey; now Manokwari, Irian Jaya).

TYPE (examined):– CMNH; holotype ♀ (in worn condition bearing five labels as follows: 1) Alcedo. B., Nther. Guinea; 2) EX-MUSAEO, Dris. BOISDUVAL; 3) 9931; 4) TYPE; 5) CMNH HOLOTYPE # 737, Macroglossum alcedo Boisd.

Remarks

The specimen figured under this name by D'Abrera (1974) is *M. insipidum.*

Distribution

North-eastern Queensland from Darnley Island and Cape York to Etty Bay near Innisfail; sometimes common locally.

Range beyond Australia: New Guinea and Key Islands.

Fig. 2. Distribution of *M. alcedo* Boisduval.

Published records (Australia only). North Queensland (Rothschild and Jordan 1903, Seitz 1928-30).

Records from material examined. QUEENSLAND: Darnley Island, Dec.; Cape York, Apr.; Iron Range, Apr., May, Aug., Sep., Dec.; Cairns district; Kuranda, Feb.; Yungaburra, Apr.; Atherton, Jan., Mar.-May, Dec.; Tolga Scrub, Apr.; Malanda, Apr.; Meringa (near Gordonvale) June, July, Dec.; Etty Bay (near Innisfail), Feb. (AM, ANIC, DPIM, MSM, MV, QM, SAM, UQ, WFG).

M. insipidum papuanum Rothschild and Jordan
(Figs 3, 12)

Macroglossum insipida papuanum Rothschild and Jordan, 1903: 642-643, pl. 3, fig. 9 (Fergusson Island, Papua New Guinea).
TYPE (examined):– BMNH; holotype ♂, bearing five labels as follows: 1) Fergusson I., x.xi.94, (A.S. Meek); 2) M. insipida papuanum. Type. R. & J. 1903; 3) type; 4) Nov. Zool., pl 3, Fig. 9, 1903; 5) Rothschild Bequest, B.M. 1939-1.
Macroglossum alcedo Boisduval: D'Abrera, 1974: 67, illustr. (Australia). [Misidentified as *M. alcedo.*]

REMARKS

Care should be taken not to confuse this species with *M. alcedo.* The outer margin of the yellowish orange band of the hind wing above is clearly angled in *M. insipidum* whereas in *M. alcedo* the outer margin curves without a point of angulation; in addition *M. insipidum* is a little smaller with a fore wing length rarely exceeding 18 mm.

DISTRIBUTION

Eastern Queensland from the islands of Torres Strait to Mackay; usually rare.

Range beyond Australia: Southern Papua to the Louisiade Archipelago. Other subspecies occur from India to the Andaman Islands, Sri Lanka, Malaysia, through Indonesia to China.

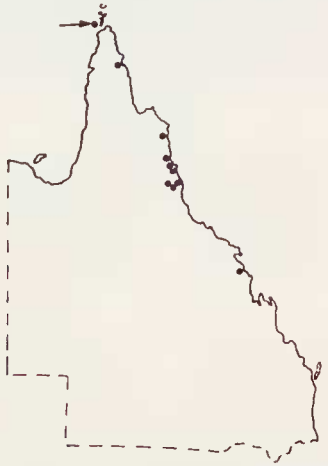


Fig. 3. Distribution of *M. insipidum papuanum* Rothschild and Jordan.

Published records (Australia only). Queensland (Rothschild and Jordan 1903, Seitz 1928-30).

Records from material examined. QUEENSLAND: Booby Island, Torres Strait, Dec.; Iron Range, May; Cooktown, Apr., May; 16 km S of Daintree, Apr.; Cairns, Aug., Sep.; Kuranda, Oct.-Aug.; Ravenshoe, Mar.; Etty Bay (near Innisfail), Feb.; Kareeya Power Stn (near Carstone), Jan.; Mackay (AJG, ANIC, DL, MSM, MV, QM, WNBQ).

There are two specimens in AM and two in SAM labelled "Warra" (near Chinchilla, SE Qld). Having regard to the confirmed distribution as above, and the apparent close association of the species with rainforest, this is considered a doubtful locality which is here excluded when listing the distribution of the species.

M. heliophilum Boisduval

Macroglossa Heliophila Boisduval, 1875: 354-355 (Halmeira, =Halmahera Is., Indonesia).
TYPE (examined):– CMNH; holotype ♀ bearing four labels as follows: 1) Macroglossa sp.?, Jarva; 2) Macroglossum heliophila Boisd; 3) Carn. Museum, Donat. by Dr. Clark, Unique; 4) CMNH HOLOTYPE #739, Macroglossa heliophila Boisd.
The conflict of locality data suggest that this specimen is, in fact, not the holotype. However, no other specimen could be found in CMNH, BMNH or MP bearing locality data corresponding to that of the original description.
Macroglossum heliophila Boisduval: Rothschild and Jordan, 1903: 645-646.
Macroglossa Fringilla Boisduval, 1875: 352-353 (India).
TYPE (examined):– MP; holotype bearing five labels as follows: 1) M. fringilla Boisd, Bengale, MM. Diard et Duvancel [a large yellow label]; 2) Diard et Duvancel [very old round label–names of the collectors]; 3) HOLOTYPE; 4) type de Bdv [probably writted by F. Le Cerf]; 5) [reference to the original description placed on specimen by P. Viette, pers. comm.].
A specimen in CMNH (examined by me) is also labelled as the holotype of *M. fringilla* but it does not have type status. It is labelled as being "ex. Musaeo Dris Boisduval" but bears a locality label "Java". At the end of the original description Boisduval writes that the species is described from *one specimen* collected in *India* by the late Duvancel, traveller for the Government. Boisduval also adds the abbreviation "M.N." to indicate that the type was in Museum national. The label data of the specimen in MP agree with Boisduval's statement and there is no reason to doubt that it is not the true type.
Macroglossum melas Rothschild and Jordan, 1903: 646, pl. 3, fig. 19 (Key Islands, N. Guinea, Woodlark I., Queensland). **Syn. nov.**
TYPE (transparencies examined):– BMNH; holotype ♀ bearing five labels as follows: 1) Little Kei, (H. Kühn); 2) Macroglossum melas, Type, R. & J. 1903; 3) Type; 4) Nov. Zool., Pl. 3, Fig.19, 1903; 5) Rothschild Bequest, B.M. 1939-1.
Macroglossa nigrifasciata Butler, 1881 (*non* Butler, 1875): 670 (Formosa).
TYPE (not examined):– BMNH.
Macroglossa kanita Swinhoe, 1892: 5, pl. 1, fig. 2 (Sumatra).
TYPE (not examined):– HOPE.
Macroglossa loochooana Rothschild, 1894: 67 (Loochoo Islands).
TYPE (not examined):– BMNH.

Remarks

The name *M. fringilla* has been widely used for this species during much of this century. Boisduval (1875) described both *M. fringilla* and *M. heliophilum* on pages 352 and 354 respectively. Rothschild and Jordan (1903) synonymised the two names and chose *M. heliophilum* as the valid one. But five years later (Rothschild and Jordan 1907) they reversed their selection of

name and used *fringilla* in preference to *heliophilum*, a decision followed by Jordan (1911), Wagner (1915), Mell (1922), Seitz (1928-30) and other more recent authors. However, as first revisers, Rothschild and Jordan's 1903 selection of *heliophilum* as the valid name must stand following current rules of nomenclature.

Examination of the types of *Macroglossa heliophilum, Macroglossa fringilla, Macroglossa melas* and *Macroglossum melas queenslandi* and other material in ANIC, BMNH and MV shows that *melas queenslandi, melas, heliophilum* and *fringilla* are all the one species, *viz. heliophilum.*

The orange band on the hind wing upperside is variable between individuals. Its outer margin can be either sharply defined or ragged to varying degrees, there is also some variation in its width, and the lobe-like extension of the orange along the inner margin towards the tornus is variable in its form. In addition the tonal intensity and size of markings on the fore wing upperside is also variable to some degree.

There is no justification for retaining *melas* as a distinct species as currently placed; the colour differences mentioned by Rothschild and Jordan (1903) fall within the range of variation and the very minor genitalia differences they discussed by which they partly justified the specific status of *melas* are insufficient, a fact which they more or less recognised when they state "Sexual armature not essentially different from that of *heliophila* . . . ." and at the end of the species description "This may be the Papuan representative of *heliophila.* Further material is necessary to decide the question". It is interesting to note that the figures of *heliophilum* genitalia included in Inoue (1973) show characters which fall almost midway between those of *melas* and *heliophilum* as figured by Rothschild and Jordan.

M. heliophilum queenslandi Clark *Comb. nov.*
(Figs 4, 7)

Macroglossum melas Rothschild and Jordan, 1903 (*partim.*: only Queensland): 646.
Macroglossum melas queenslandi Clark, 1927: 108 (Kuranda).

TYPE (examined):– CMNH; holotype ♂ bearing six labels as follows: 1) Australie, Queensland, Kuranda, Dodd, 1910; 2) M. melas queenslandi, type, B. P. Clark (1926); 3) TYPE; 4) 10557; 5) No. 3; 6) CMNH HOLOTYPE # 736, Macroglossum melas queenslandi Clark.

Macroglossum heliophilum (Boisduval): D'Abrera, 1974: 67, illustr. (Australia).

REMARKS

The three Australian examples of *queenslandi* seen are similar and differ slightly from specimens from Indonesia and beyond essentially in having the median transverse band on the fore wing upperside almost white rather than off white or greyish and the dark postmedian band across the fore wing prominent, almost black, and similar in width to the whitish band rather than greyish or reduced in width. The subspecific status of the Australian material is therefore retained.

DISTRIBUTION

Known only from Kuranda, north-eastern Queensland; rare.

Range beyond Australia: Papua New Guinea. *M. heliophilum* also ranges from Sri Lanka and India to Malaysia and Indonesia, through the Philippines, Taiwan, Japan and S. China but to what extent subspecific separation is warranted is unclear.

Published records (Australia only). Queensland (Rothschild and Jordan 1903, Seitz 1928-30); Kuranda (Clark 1927).

Records from material examined. QUEENSLAND: Kuranda, July, Dec. (ANIC, CMNH, MV).

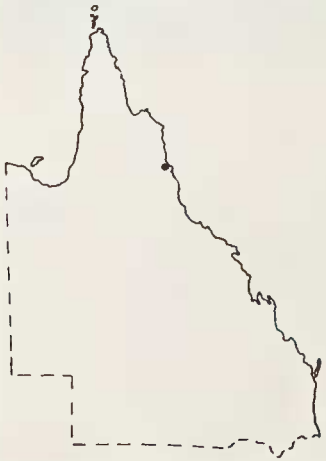


Fig. 4. Distribution of *M. heliophilum queenslandi* Clark.

M. prometheus lineatum Lucas *Stat. nov.*
(Figs 5, 11)

Macroglossa lineata Lucas, 1891: 834 (Mackay).

TYPE (examined):– SAM; holotype ♀, bearing only two handwritten labels, the smaller reading "Macroglossa lineata Lucas, Mackay, probable type, I 13812", and in red ink across the right hand end the word "Type"; the other label has identical wording but without the words "probable type". This is the only representative of this species in the Lucas Collection and the original description leaves no doubt that this is the species Lucas was describing.

Macroglossa inusitata Swinhoe, 1892: 6 (Dorey; now Manokwari, Irian Jaya).

TYPE (examined):– HOPE; holotype ♂, bearing five labels as follows: 1) Dor.; 2) Wallace; 3) 20; 4) TYPE, SWINHOE, Cat. East. Lep. Het. Oxford, 1892. Vol. 1, page 6. Coll. Hope Oxon.; 5) TYPE LEP.: No. 37, Macroglossa inusitata Swinhoe, HOPE DEPT. OXFORD.

Macroglossum prometheus inusitata Swinhoe: Rothschild and Jordan, 1903: 651.

Macroglossa approximata Miskin, 1891 (*non* Walker, 1864): 7 (Cardwell).

TYPE:– location unknown.

Macroglossa insonspicua Rothschild, 1894: 68 (New Guinea).

TYPE (not examined):– BMNH.

REMARKS

Rothschild and Jordan (1903) used the name *inusitata* concluding that the name *lineata* was unavailable. The principal they used for making this decision is, however, not in accordance with the current *Code of Zoological Nomenclature*. Contrary to the statement of Rothschild and Jordan (1903: 652) that Lucas' description of *lineata* applies in part to *corythus pylene* (abdomen) and *prometheus inusitata* (wings) the type of *lineata* is clearly the latter.

DISTRIBUTION

Cape Wessel, Northern Territory, and north-eastern Queensland from Cape York to Mackay; uncommon.

Range beyond Australia: this subspecies occurs also in New Guinea and adjacent islands. The nominal subspecies ranges from Sri Lanka and India, through Malaysia, Indonesia and the Philippine Islands. There are no other subspecies.

Published records (Australia only). Queensland (Kirby 1894, Rothschild and Jordan 1903, Seitz 1928-30, Wagner 1915); Cardwell (Miskin 1891); Mackay (Lucas 1891, Miskin 1892, Rothschild and Jordan 1903).

Records from material examined. NORTHERN TERRITORY: Cape Wessel (Rimbija Is.), Jan. (ANIC). QUEENSLAND: Cape York, Apr.; Lizard Island (NNE of Cooktown), Nov.; Cooktown; Kamerunga (near Cairns), Aug.; Cairns, Apr.; Kuranda, Mar., July, Aug.; Meringa (near Gordonvale), Feb.; Babinda, Aug.; Bramston Beach (near Babinda), Mar.; Rockingham Bay (near Tully and Cardwell); Cardwell; Mackay. (AJG, ANIC, DL, EJH, MSM, MV, QM, SAM).

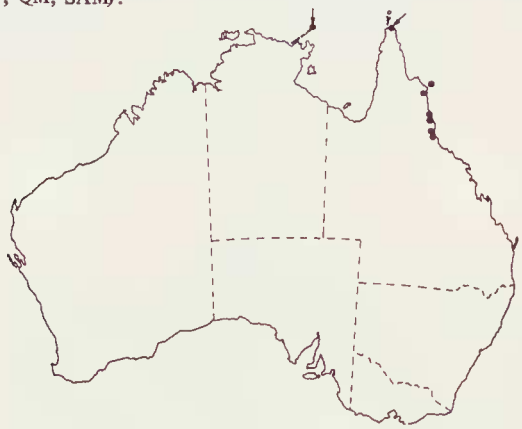


Fig. 5. Distribution of *M. prometheus lineatum* Lucas.

M. joannisi Rothschild and Jordan
(Figs 6, 10)

Macroglossum joannisi Rothschild and Jordan, 1903: 656-657, pl. 3, fig. 2 (Queensland).
TYPE (transparency examined):– MP; holotype ♀.

?*Macroglossum tenebrosum* Lucas: D'Abrera, 1974: 68, illustr.
The specimen figured by D'Abrera under the name *M. tenebrosum* is not that species and is almost certainly a slightly discoloured *M. joannisi*.

DISTRIBUTION

King River in Northern Territory, Torres Strait islands, near Cooktown and Willis Island in the Coral Sea. The species is almost certainly migratory, especially considering the records from the rather isolated Willis Island.

Range beyond Australia: not known beyond Australia but probably also occurs in New Guinea and Indonesia.

Published records. Queensland (Rothschild and Jordan 1903, 1907, Seitz 1928-30, Wagner 1915).

Records from material examined. NORTHERN TERRITORY: King River, 133°30′E, 12°S, 7.i.1916 (MV). QUEENSLAND: Sue (= Warraber) Is., Torres Strait, Jan.; Booby Is., Torres Strait, Jan.; Blad Hills Stn. (=Louisiana Stn), 30 km N of Cooktown, Feb.; Willis Is., Coral Sea, Jan. (ANIC, MSM).

Fig. 6. Distribution of *M. joannisi* Rothschild and Jordan.

M. nubilum Rothschild and Jordan
(Figs 13, 22)

Macroglossum nubilum Rothschild and Jordan, 1903: 652, pl. 4, fig. 17 (Milne Bay).
TYPE (examined):– BMNH; holotype ♂, bearing five labels as follows: 1) Milne Bay, Brit. N.G., I.99, (A. S. Meek); 2) Type; 3) Macroglossum nubilum, Type, R & J, 1903; 4) Nov. Zool., Pl. 4, Fig. 17, 1903; 5) Rothschild Bequest, B.M. 1939-1.

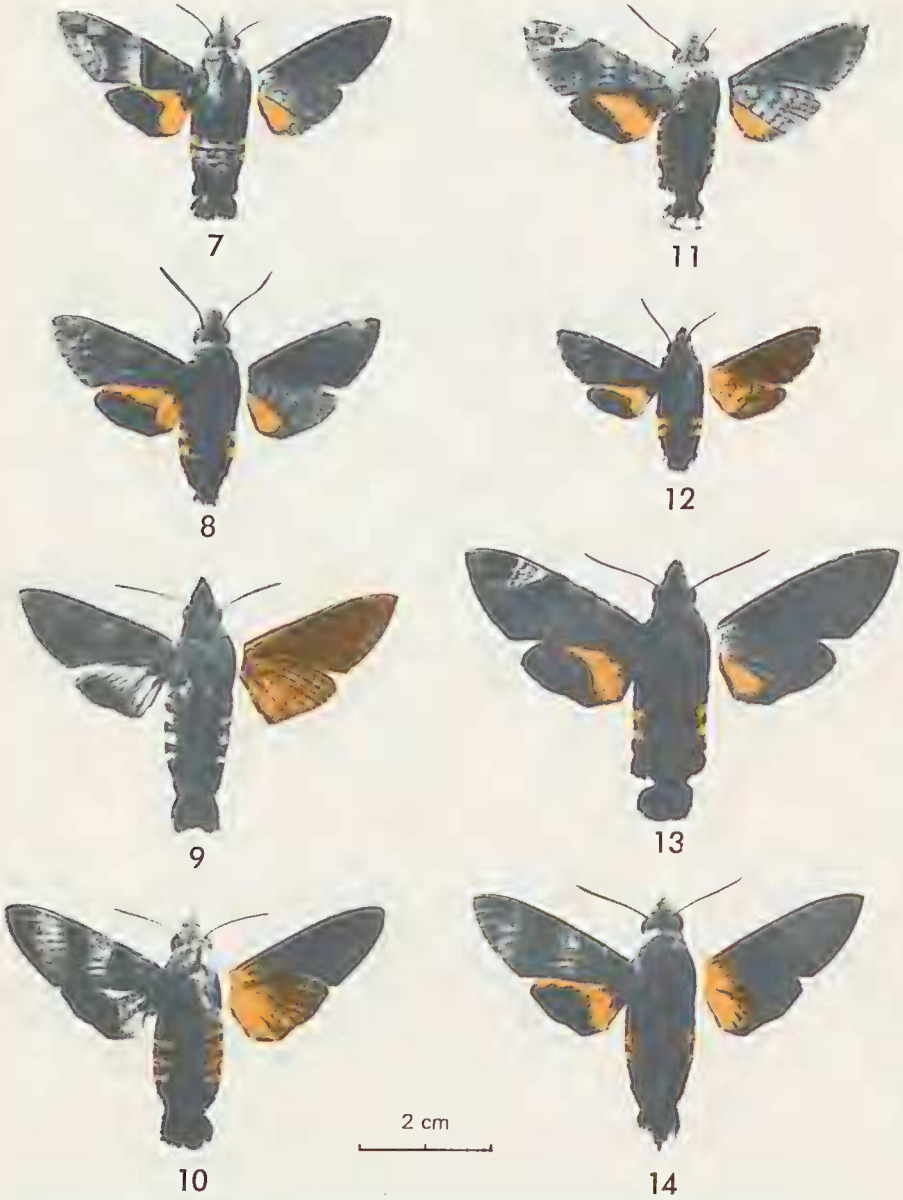
DISTRIBUTION

North-eastern Queensland from Iron Range to Cardstone (near Tully); uncommon. All recent captures have been made close to rainforest.

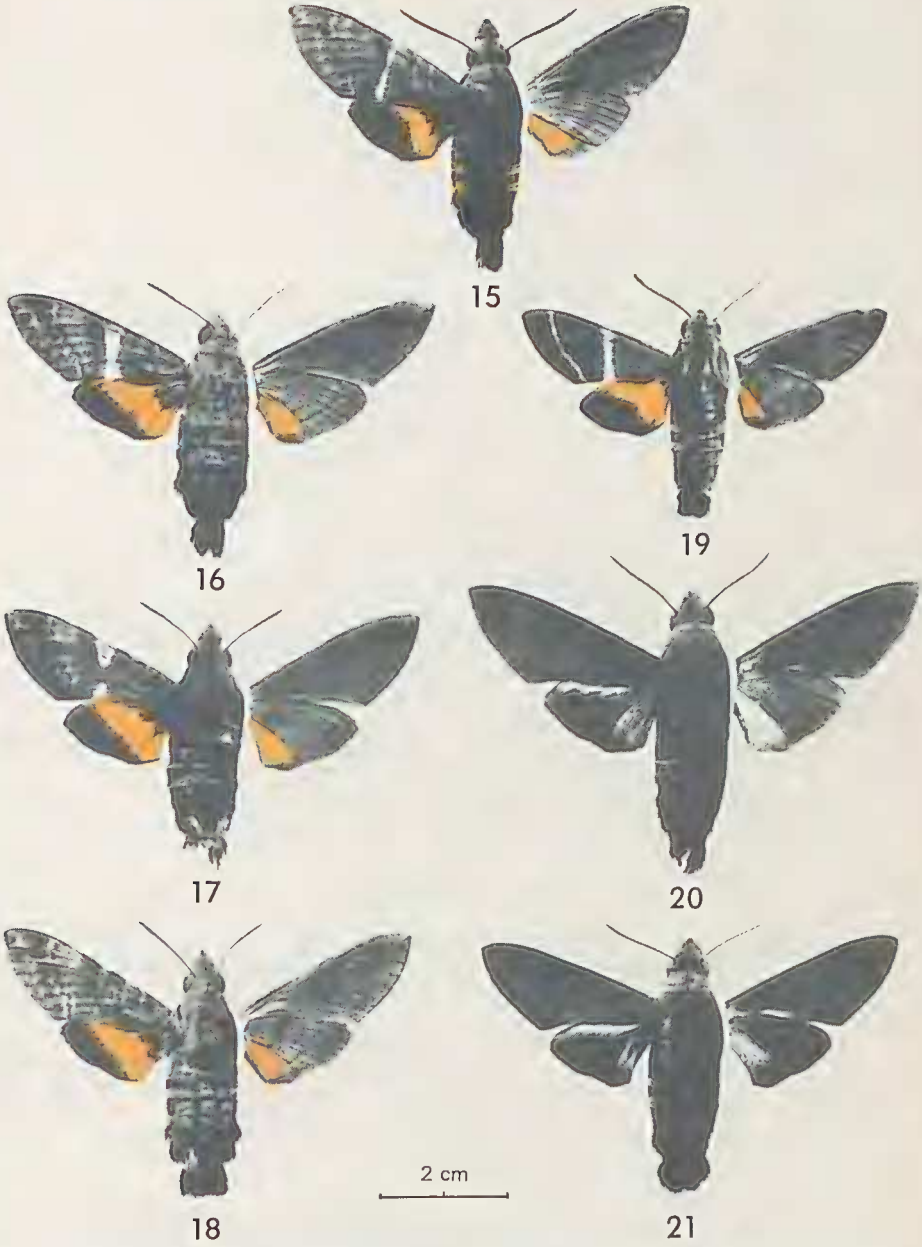
Range beyond Australia: New Guinea.

Published records (Australia only). Kuranda (Hopper 1980).

Records from material examined. QUEENSLAND: Iron Range, Dec., Jan.; Isabella Falls, 30 km N of Cooktown, Feb.; Cooktown, Apr.; Julatten, Feb., Mar., Aug.; Mossman,



Figs 7-14. *Macroglossum* species (diagnostic colouring inserted): (7) *M. heliophilum queenslandi* Clark; (8) *M. alcedo* Boisduval; (9) *M. vacillans* Walker; (10) *M. joannisi* R. & J.; (11) *M. prometheus lineatum* Lucas; (12) *M. insipidum papuanum* R. & J.; (13) *M. nubilum* R. & J.; (14) *M. corythus pylene* Felder



Figs 15-21. *Macroglossum* species (diagnostic colouring inserted): (15) *M. rectans* R. & J.; (16-18) *M. hirundo errans* Walker; (19) *M. dohertyi* Rothschild; (20) *M. tenebrosum* Lucas (21) *M. micaceum micaceum* Walker.

Apr.; Cairns district, Feb., May, June, Nov.; Kuranda, Jan., Feb., Apr.-Sep., Nov.; Lake Barrine, Jan.; 15 km SW of Gordonvale (550 m) Jan.; Etty Bay (near Innisfail), Dec., Feb.; Cardstone, Jan. (dead in spider web). (AH, AJG, ANIC, DL, EP, MSM, MV, QM, UQ, WNBQ).

There are three specimens in SAM labelled "Brisbane". Having regard to the confirmed distribution above, and the fact that the species appears to be closely associated with rainforest, these records are considered erroneous.

Fig. 22. Distribution of *M. nubilum* Rothschild and Jordan.

M. corythus pylene Felder
(Figs 14, 23)

Macroglossa Pylene C. Felder, 1861: 29 (Amboina, = Ambon).

TYPE (examined):– BMNH; holotype ♀, bearing five labels as follows: 1) Amboin, Doleschall, Type; 2) Type; 3) FELDER COLLn.; 4) Nov. Zool., Pl. 4, Fig. 7, 1903; 5) Rothschild Bequest, B.M. 1939-1.

Macroglossum corythus pylene Felder: Rothschild and Jordan, 1903: 661-662, pl. IV, fig. 7.

Macroglossa approximans Lucas, 1891: 834 (Mackay).

TYPE (examined):– SAM; holotype ♂, bearing four labels as follows: 1) Macroglossa approximans Luc., Mackay, Type, I.13811; 2) [repeat of label 1]; 3) 434, L, .4) S.A. Museum Specimen.

Macroglossum stenoxanthum Turner, 1925: 41-42 (Kuranda). **Syn. nov.**

TYPES (examined):– MV; syntype ♂, bearing four labels as follows: 1) Kuranda, Jan. 1912, F.P.D; 2) Macroglossum stenoxanthum Turn., TYPE; 3) G. Lyell Coll., Pres. 31.7.32; 4) National Museum of Victoria, Melbourne. ANIC; syntype ♀, bearing two labels as follows: 1) Kuranda, Jan. 1912, F.P.D.; 2) PARATYPE, Macroglossum stenoxanthum Turner 1925.

Macroglossa phlegeton Boisduval, 1875: 346 (New Guinea).

Macroglossa motacilla Boisduval, 1875: 347 (Dorey; now Manokwari, Irian Jaya).

Macroglossa cyniris Boisduval, 1875: 350 (Halmahera, = Halmahera Is., Indonesia).

Macroglossa volucris Pagenstecher, 1884 (*non* Walker, 1856): 210 (Amboina, = Ambon).

Macroglossa labrosa Swinhoe, 1892: 5 (Buru).

Macroglossa moluccensis Rothschild, 1894 (*partim*): 67 (New Guinea, Moluccas).

REMARKS

Australian specimens agree closely with New Guinea material. Although the orange-yellow band of the hind wing above is often more reduced in Australian examples, the degree of variation does not warrant subspecific status. New Guinea specimens show considerable variation in the width of the orange-yellow band and, while Australian specimens are less variable, it is not difficult to find almost identical examples from each country. The type of *M. stenoxanthum* is "typical" of Australian material and agrees well with New Guinea specimens that have the orange-yellow of the hind wing above reduced.

Contrary to the statement of Rothschild and Jordan (1903: 652) that Lucas' description of *approximans* applies in part to *corythus pylene* (wings) and *prometheus inusitata* (abdomen) the type of *approximans* is clearly the former.

DISTRIBUTION

Darwin, Northern Territory, and north-eastern Queensland from the islands of Torres Strait to Mackay; usually rare.

Range beyond Australia: this subspecies also ranges through New Guinea and neighbouring islands. Other subspecies occur in China, Japan, Taiwan, India, Sri Lanka, Malaysia, the Philippines, Indonesia, Solomon Islands, New Hebrides, New Caledonia and Loyalty Islands.

Published records (Australia only). Queensland (Kirby 1894, Rothschild and Jordan 1903, Seitz 1928-30, Wagner 1915); Kuranda, Jan. (Turner 1925); Mackay (Lucas 1891).

Records from material examined. NORTHERN TERRITORY: Darwin, Apr. (DANT). QUEENSLAND: Sue (= Warraber) Is., Torres Strait, Dec., Feb.; Booby Is., Torres Strait, Feb.; Cape York, Apr.; Cooktown; Kuranda, Nov.-May; Cairns; Meringa (near Gordonvale) Dec.; Mackay. (AM, ANIC, DL, MSM, MV, QM, SAM).

There is also a specimen in SAM labelled "Brisbane". The absence of other records south of Mackay suggests that this record is erroneous and it is here disregarded.

Fig. 23. Distribution of *M. corythus pylene* Felder.

M. rectans Rothschild and Jordan
(Figs 15, 24)

Macroglossum rectans Rothschild and Jordan, 1903: 650, pl. 4, fig. 8 (Kei Islands, = Key Islands).

TYPE (examined):– BMNH; holotype ♂, bearing five labels as follows: 1) Little Kei, 9.II.97 (H. Kühn); 2) Macroglossum rectans, Type, R. & J. 1903; 3) Nov. Zool. Pl. 4, Fig. 8, 1903; 4) Type; 5) Rothschild Bequest, B.M. 1939-1.

REMARKS

Care should be taken not to confuse this rare species with the common *M. hirundo*. It can be distinguished by the characters listed in couplet 6 of the key provided at the beginning of this paper.

DISTRIBUTION

Far northern part of Northern Territory and north-eastern Queensland from Torres Strait Islands to Ayr; rare and apparently closely associated with wet season rains. The occurence of specimens on the arid extremity of Cobourg Peninsula, and on Rimbija and Booby Islands far removed from favourable breeding sites strongly suggests that the species is migratory.

Range beyond Australia: New Guinea and Key Islands.

Published records (Australia only). Queensland (Rothschild and Jordan 1903, 1907; Seitz 1928-30).

Records from material examined. NORTHERN TERRITORY: Darwin, Jan.; Black Point, Cobourg Peninsula, Jan.; Rimbija Is., Wessel Islands, Jan.; Mainoru, ENE of Katherine, Nov.; (ANIC, MSM, MV). QUEENSLAND: Banks Is; Booby Island, Jan.; Cooktown, Dec.; Julatten, Mar.; Yorkeys Knob, Mar.; Mulgrave R., (30 m), 25 km SW of Gordonvale, Jan.; Ayr, Jan. (AH, AJG, ANIC, MSM).

Fig. 24. Distribution of *M. rectans* Rothschild and Jordan.

M. hirundo errans Walker
(Figs 16-18, 25)

Macroglossa errans Walker, 1856: 96 (Australia).

TYPE (examined):– BMNH; holotype ♂, bearing a circular label with a red border on which is printed "Type" and a circular label on which is handwritten "Australia 52-70".

In the original description Walker lists only one specimen as representing what he considered typical *errans*. A further four are listed as variants. No specimen was designated as "the type" but following Article 72(b)(i) of the *International Code of Zoological Nomenclature* variants are to be excluded from the type series thus leaving, in this case, only the single typical specimen which therefore acquires holotype status.

Macroglossum hirundo errans Walker: Rothschild and Jordan, 1903: 649-650.

Macroglossum hirundo errans, forma *interrupta* Closs, 1911 (*non* Butler 1875): 199 (Rockhampton).

TYPE:– location unknown. Dr H. J. Hannemann of the Zoologisches Museum, East Berlin, has kindly advised that although the museum acquired part of the Closs collection the type of *interrupta* is not included. This is the form of *M. hirundo* that has the transverse band of the fore wing broken.

Macroglossa belinda Pagenstecher, 1900: 18 (N. Pommern).

TYPE (not examined):– BMNH.

Rhamphoschisma Scottiarum R. Felder, *in* Felder and Rogenhofer, 1874: pl. 75, fig. 8 (no text).

TYPE (examined):– BMNH; holotype ♂, bearing six labels as follows: 1) a small circular label handwritten in four lines interpreted as–Rokampton, Mus Godeffroy; 2) Rhamphoschism Scottiarum, Type, Nov., 75.8.; 3) TYPE of scottiarum Feld.; 4) Type; 5) Rothschild Bequest, B.M. 1939-1; 6) a small blank orange square without data.

Felder does not give the type locality but one label attached to the type implies that it was taken at Rockhampton while Boisduval (1875) gives the type locality as "l'Australie". The only landing in Australia during the *Novara* voyage was at Sydney from 5 November to 7 December 1858. It is, therefore, almost certain that the specimen was not actually collected in Australia during this voyage as the species is an extreme rarity in Sydney, this locality being the southern limit of its known range. The type specimen (which is that figured by Felder) may well have been a gift from William Macleay given during the *Novara's* stay in Sydney.

Although the authorship of the moths of the *Novara* voyage is Felder and Rogenhofer, the authorship of this name is attributed to Felder alone (see Boisduval 1875: 354). Also, the year of publication of *Reise Novara Lep.* 4 has at times been quoted as 1875. D. S. Fletcher, 1979, *The generic names of moths of the world* 3: x, points out that evidence from accounts of meetings of the Royal Academy of Science in Vienna suggests that publication was most likely 1874 and not 1875.

Remarks

The transverse pale band across the fore wing is highly variable; it is often broken centrally (holotype) form *interrupta* Closs and can be entirely absent; on some specimens this band is narrow while on others it is noticably broad. Care should be taken not to confuse this species with the rare *M. rectans* which can be readily distinguished from *M. hirundo* by the much narrower orange band on the hind wing above (refer to couplet 6 of the key provided at the beginning of this paper).

DISTRIBUTION

Northern half of Northern Territory, and eastern Queensland and New South Wales from the islands of Torres Strait to Sydney; common in Northern Territory and Queensland, less so in New South Wales, rare south of the Richmond River. Usually associated with wet season rains in the north.

Range beyond Australia: subspecies *errans* is also recorded from New Guinea and the Solomon Islands. Other subspecies occur in Fiji, Samoa, New Caledonia, Loyalty Islands, Lesser Sunda Islands, eastern Melanesia to Samoa, Tonga, the Society and Cook Islands.

Published records (Australia only). Queensland (Common 1970, Rothschild and Jordan 1903, 1907, Seitz 1928-30, Swinhoe 1892, Tillyard 1926, Wagner 1915, Walker 1856); Cape York (Swinhoe 1892); Atherton (Aurivillius 1920); Bowen (Miskin 1891, Rothschild and Jordan 1903); Mackay (Miskin 1892, Rothschild 1894); Rockhampton (Closs 1911, Miskin 1891, Rothschild and Jordan 1903); Brisbane (including Morton Bay) (Butler 1876, Miskin 1891, Rothschild and Jordan 1903, Walker 1856); Bandon Grove (near Dungog), Feb. (Dowling and Haines 1963); Norfolk Is., Jan. (Holloway 1977).

Records from material examined. NORTHERN TERRITORY: Darwin, Jan., Apr., June; near Smith Point, Cobourg Peninsula, Jan.; Rimbija Island, Wessel Islands, Jan., Feb.; Berry Springs, June; Jim Jim dist., Mar., May, Aug.; Batchelor (near Adelaide River), June; Tennant Creek, Dec. (AM, ANIC, DANT). QUEENSLAND: Banks Is., Mar., July; Cape York; Merluna Stn, SE of Weipa, Nov.; Iron Range, May; Archer R. crossing, Dec.; Pat Ck (near Archer R. crossing, N of Coen), June; 57 km SSE of Coen, Dec.; Silver Plains (E of Coen), May; near Laura, Dec., Jan., May; Hopevale Mission, N of Cooktown, Oct.; Cooktown, Dec., Jan., Apr., Oct.; Mossman, Mar.; Julatten, Jan.; Cairns, Jan.; Holloways Beach and Kamerunga (near Cairns), Jan., Feb., May-July; Kuranda, Jan., Feb., May, Dec.; Mareeba, Jan.; Atherton, Feb., Apr.; Lake Barrine, May; Forty Mile Scrub (near Mt Garnet), Jan., Nov., Dec.; Meringa (near Gordonvale), Feb., Apr., Nov.; Mt. Bartle Frere; Etty Bay (near Innisfail), Nov., Dec.; Kareeya Power Stn (near Cardstone), Dec., Jan.; Ingham, May; Townsville, Feb.; Burra Rg, Feb., Mar.; 65 km E of Hughenden, Feb.; Bowen, Dec., May; Shute Harbour, Mar.; Homebush, Dec.; Mackay,

Fig. 25. Distribution of *M. hirundo errans* Walker.

Jan., Mar.; Clermont, Jan., Mar.; Yeppoon, Dec., Jan.; Rockhampton, Dec., Jan.; Westwood, Jan.-Apr.; Expedition Range, Feb., Sep.; Corallie R., Bruce Hwy, NW of Gladstone, Jan.; Beecher. Dec.; Biggenden, Dec.; Rundle Rg., Dec.; Biloela, Jan., Mar.; Wallaville (near Gin Gin), Feb., Mar.; Goodnight Scrub, SW of Gin Gin, Dec.; Eidsvold; Maryborough, May; Montville; Gympie, Feb., Sep.; Maleny, Mar.; Maroochydore, Dec.; Bunya Mts, Jan.-Mar.; Ravensbourne, Feb.; Warra; Toowoomba, Jan.-Apr., Nov., Dec.; Somerset Dam, Jan.; Lawes, Jan.; Brisbane, Jan.-May, Sep., Oct.; Mt Glorious/Mt Nebo, Feb., Nov., Dec.; Mt Tamborine, Apr., May, Dec.; Burleigh Heads, Mar., May. NEW SOUTH WALES: Billinudgel (near Mullumbimby), Mar.; Richmond River, Mar.; Brunswick Heads, Mar.; Newcastle; Sydney, Mar. (AH, AM, ANIC, BCRI, DL, DPI, EP, LeS, MSM, MV, QM, SAM, UQ, WFG).

M. dohertyi Rothschild

(Figs 19, 26)

Macroglossa dohertyi Rothschild, 1894: 67, pl. 5, fig. 2, (Amboyna, = Ambon).

TYPE (examined):– BMNH; holotype ♂, bearing four labels as follows: 1) Amboyna, Feb. 1892, W. Doherty; 2) Mac. Dohertyi Rothsch. Type. Jan 1894; 3) Type; 4) Rothschild Bequest, B.M. 1939-1.

Macroglossum doddi Clark, 1922: 14-15 (Kuranda). **Syn. nov.**

TYPE (examined):– CMNH; holotype bearing five labels as follows: 1) Kuranda, Q., F. P. Dodd & Sons, Aug 1918; 2) TYPE; 3) 6290; 4) Macroglossum doddi, type. sp. nov. Clark; 5) CMNH HOLOTYPE # 735 Macroglossum doddi Clark.

REMARKS

A distinctive species but nevertheless a variable one. Of seven specimens examined no two were identical. Fresh specimens have the greater part of the fore wings above dark green.

DISTRIBUTION

North-eastern Queensland from the Torres Strait Islands to Etty Bay near Innisfail; rare.

Range beyond Australia: New Guinea and Ambon.

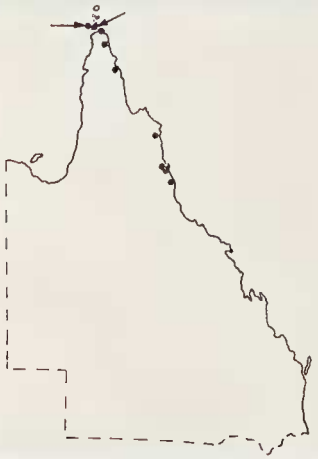


Fig. 26. Distribution of *M. dohertyi* Rothschild.

Published records (Australia only). Prince of Wales Is., Torres Strait and Cape York, June and July (Turner 1925); Kuranda (Clark 1922).

Records from material examined. QUEENSLAND: Prince of Wales Island, June; Booby Island, Apr., May; Cape York, Apr., June, July, Sep.; upper Jardine River, Cape York Pen., Oct.; Iron Range, May, Sep.; Mt Cook (near Cooktown), Dec.; Yorkys Knob (near Cairns), Apr.; Cairns, Apr.; Meringa (near Gordonvale), Feb.; Etty Bay (near Innisfail), Dec. (AJG, ANIC, DL, DPI, EP, EJH, MSM, MV, QM).

M. micaceum micaceum Walker
(Figs 21, 27)

Macroglossa micacea Walker, 1856: 96-97 (Australia and Moreton Bay).

TYPES (examined):– BMNH; syntype series of four specimens. Three specimens traced. *Lectotype here designated*, ♂, which bears a circular label on which is handwritten "Moreton Bay" and on the reverse side "56-1", a rectangular label on which is printed "21. Macroglossa micacea.", a circular red-edged label on which is printed "Type" and now also carrying a red rectangular label stating "LECTOTYPE Macroglossa micacea Walker, Moulds 1985".

Macroglossa Nox Newman, 1857 (*non* Butler, 1875): 54-55 (Moreton Bay).

TYPES (examined):– BMNH; two syntypes from Moreton Bay. The lectotype of *micacea* and one other specimen carry relevant data but neither have the pin data *nox*.

Macroglossum micacea micacea Walker: Rothschild and Jordan, 1907: 121.

DISTRIBUTION

Islands of Torres Strait through eastern Queensland to Ebor in north-eastern New South Wales; at times common.

Range beyond Australia: Papua. Another subspecies occurs in the Solomon Islands.

Published records (Australia only). Queensland (Rothschild and Jordan 1903, Seitz 1928-30, Wagner 1915); Kuranda (Hopper 1980); Mackay (Miskin 1892); Rockhampton (Miskin 1891); Moreton Bay (Butler 1876. Newman 1857, Swinhoe 1892, Walker 1856); Brisbane (Miskin 1891).

Fig. 27. Distribution of *M. micaceum micaceum* Walker.

Records from material examined. QUEENSLAND: Sue Is., Torres Strait, Feb., Dec.; Booby Is., Torres Strait, Dec., Jan.; Thursday Is., Torres Strait, Jan.; Lizard Is., NNE of Cooktown, Nov.; Cooktown, Apr., Oct., Dec.; Mt Windsor Tableland, NW of Mossman, Jan.; Julatten, Nov.; Kuranda, Jan., Mar.-June, Oct., Dec.; Cairns, Jan., May, Sep., Nov.; Mt Baldy, approx 8 km W of Atherton, Jan.; Atherton, Mar.; Lake Barrine, Jan.; Bulimba Hstd, WNW of Chillago, Feb., Mar.; Forty Mile Scrub, SSW of Mt Garnet, Mar.; Meringa (near Gordonvale), Mar., Apr.; Mt Bellenden Ker summit, Jan.; Etty Bay (near Innisfail), Nov., Dec.-Mar.; Mission Beach, Nov.; near Wallaman Falls, Mar.; Ingham, Apr.; Paluma, Jan., Feb.; Townsville, Mar., Apr., June; Bowen (Port Denison), Dec.; Mackay, Nov.; Pine Islet, Percy Is. Group, Dec.; Clermont, Mar.; Byfield, Feb.; Yeppoon, Jan., Apr.; Rockhampton, Dec.-Feb.; Westwood, Mar., Apr.; Duaringa district, Jan.; Corallie R., Bruce Hwy, NW of Gladstone, Jan.; Gladstone district, Jan.; Kroombit Tops, SW of Gladstone, Feb.; Bundaberg, Mar.; Hervey Bay (near Maryborough), Jan.; Dalby; Somerset Dam, Dec.; Mt Glorious/Mt Nebo, Mar., Apr., Oct., Nov.; Brisbane, Jan.-May, Nov.; Lawes, Jan.; Toowoomba, Jan., Feb., May, Dec.; Canungra, Feb.; Southport, Feb. NEW SOUTH WALES: Billinudgel (near Mullumbimby), Mar.; Ebor, Jan., Nov. (AH, AM, ANIC, DL, DPI, EJH, EP, JO, MC, MSM, MV, QM, RM, UQ, SAM).

M. tenebrosum Lucas

(Figs 20, 28)

Macroglossa tenebrosa Lucas, 1891: 834 (Rockhampton).

TYPE (examined):– SAM; ? holotype, ♀, bearing one label as follows: "Macroglossa tenebrosa Lucas, ?Type, agrees but expanse different, unique in L. coll.". The difference in the measurement of the wing expanse most likely has arisen from the specimen partly relaxing so that the wings now spread more widely than in the original setting. The fore wings appear to have pulled back as they now have the costa more or less at right angles to the body.

Macroglossum tenebrosum Lucas: Tillyard, 1926: 448

Macroglossa nox Butler, 1875 (*non* Newman, 1857): 5, pl. 1, fig. 6 (Rockingham Bay).

TYPE (examined):– BMNH; holotype ♂, the same specimen that is the type of *M. splendens* Butler, *q.v.* [refer Butler (1892)]. **Syn. nov.**

Macroglossa vox Butler, 1892: 20. [An incorrect spelling of *nox.*]

Macroglossa splendens Butler, 1892: 20. **Syn. nov.**

TYPE (examined):– BMNH; holotype ♂, bearing four labels as follows: 1) Aust.; 2) R. Bay; 3) splendens Butl. type; 4) Type. This specimen is also the type of *M. nox* Butler.

Macroglossum splendens Butler: Rothschild and Jordan, 1903: 669-670, pls LVI, fig. 53 and LXIV, fig. 22.

Macroglossa micacea Walker, 1856 (*partim*): 96-97. **Syn. nov.**

The female of *M. nox* was described as that of *M. micaceum.*

REMARKS

The specimen figured by D'Abrera (1974) under this name is not this species. It appears to be a slightly discoloured specimen of *M. joannisi.*

DISTRIBUTION

North-eastern Queensland from the islands of Torres Strait to Yeppoon (near Rockhampton); uncommon.

Range beyond Australia. Eastern Indonesia, through New Guinea to the Solomon Islands.

Published records (Australia only). Queensland (Kirby 1892, Rothschild and Jordan 1903, 1907, Seitz 1928-30, Wagner 1915); Rockingham Bay (Butler 1875, 1876, 1892); Cardwell (Miskin 1891); Mackay (Miskin 1891); Rockhampton (Lucas 1891).

Records from material examined. QUEENSLAND: Sue Is., Torres St., Mar.; Booby Is., Torres St., Dec.; Iron Range, Apr.; Cooktown, Apr.; Palmer R.; Jan.; Julatten, Apr.; Cairns,

Mar.; Kuranda, Jan.-May, July-Sep., Dec.; Lake Barrine, Apr.; Malanda, May; Gordonvale; Innisfail; Etty Bay (near Innisfail), Feb.; Dunk Island, May; Mission Beach, Jan.; Rockingham Bay (near Tully and Cardwell); Mackay; Yeppoon, Mar. (AJG, AM, ANIC, EJH, MSM, MV, QM, SAM, UQ, WFG, WNBQ).

In SAM there are specimens labelled Warra and Brisbane. These localities are doubtful and require confirmation; they are much further south than I would expect the species (which I have found only in association with rain forest) to occur.

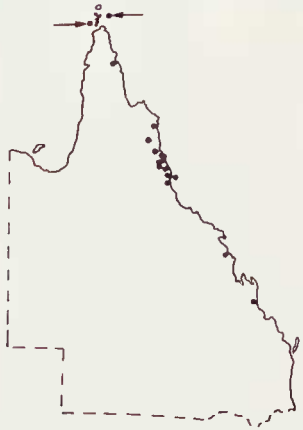


Fig. 28. Distribution of *M. tenebrosum* Lucas.

Discussion

It is interesting to note that *M. joannisi* is the only endemic *Macroglossum* species occurring in Australia. *M. stenoxanthum* had previously been considered an Australian endemic but it is now clear that it is a synonym of *M. corythus pylene.* The majority of *Macroglossum* species found in Australia range north-west through Indonesia, some extending as far afield as India and China. Only one species, *M. hirundo*, ranges eastwards and, although this species is widespread, its distribution is confined to Melanesia and Polynesia.

Within Australia, north-eastern Queensland is undoubtedly the region richest in *Macroglossum* species. All 13 species found in Australia occur in this region and with but one possible exception, *M. vacillans,* numbers of specimens in collections indicate that the highest population densities of these species also occur in this region. Seven species, *M. vacillans, M. hirundo, M. rectans, M. prometheus, M. corythus, M. joannisi* and *M. micaceum,* range beyond north-eastern Queensland. Of these all but *M. micaceum* also occur in the northern part of the Northern Territory, while *M. vacillans* is found further west, near Derby in Western Australia. Only two species, *M. hirundo* and *M. micaceum,* range south of the tropics, both occurring along the eastern coasts of Queensland and New South Wales, the former as far south as Sydney and the latter as far as Ebor.

Much remains to be learnt concerning the influences affecting the geographical and seasonal distributions of Australian *Macroglossum* species.

There is little doubt, however, that the presence of rainforest and the tropical wet season play significant roles. All species have been taken in rainforest in north-eastern Queensland and population numbers are usually highest during or immediately after the wet season (approximately January to April). It is most likely that the majority of *Macroglossum* food plants are rainforest species. To date only *M. hirundo* and *M. vacillans* are known regularly to inhabit non-rainforest regions. The larvae of *M. hirundo* feed on at least one non-rainforest plant (Moulds 1984) while the wide distribution of *M. vacillans* in semi arid areas of the Northern Territory and Western Australia suggests that this species may also have at least one non-rainforest food plant.

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Index to species, subspecies and forms

(Valid names in bold type)